Metal Oxide-Carbon Nanocomposites for Aqueous and Nonaqueous Supercapacitors, Phase I

Completed Technology Project (2010 - 2011)

Project Introduction

This Small Business Innovation Research Phase I effort focuses on development of novel metal-oxide-carbon nanocomposites for application in pseudocapacitive electrochemical supercapacitors. Specifically, nanocomposites based on manganese, titanium, tantalum and vanadium oxides will be incorporated, at the nanoscale level, with electrically conductive carbon supports. Our focus will be to combine the desired pseudocapacitive characteristics of metal oxides with high surface area and large electrical conductivity of carbon supports while achieving economical and scalable manufacturing. The proposed nanocomposite materials will be tested as electrode materials in aqueous and nonaqueous supercapacitors. The proposed project will be a joint effort on NanoScale Corporation and Battelle Memorial Institute. NanoScale's role in the effort will be to synthesize nanocomposite materials, characterize their physical and chemical properties, and to optimize them based on results of electrochemical testing carried out by Battelle. Battelle's role in the effort will be to take the metal oxides prepared by NanoScale and fabricate them into supercapacitor elements to be tested in half-cell and full-cell devices. NanoScale is uniquely qualified to carry out the proposed research due to its rich experience in development and scaled-up synthesis of nanosized materials, including materials for battery applications. NanoScale has worked previously on several projects related to battery technologies.

Primary U.S. Work Locations and Key Partners

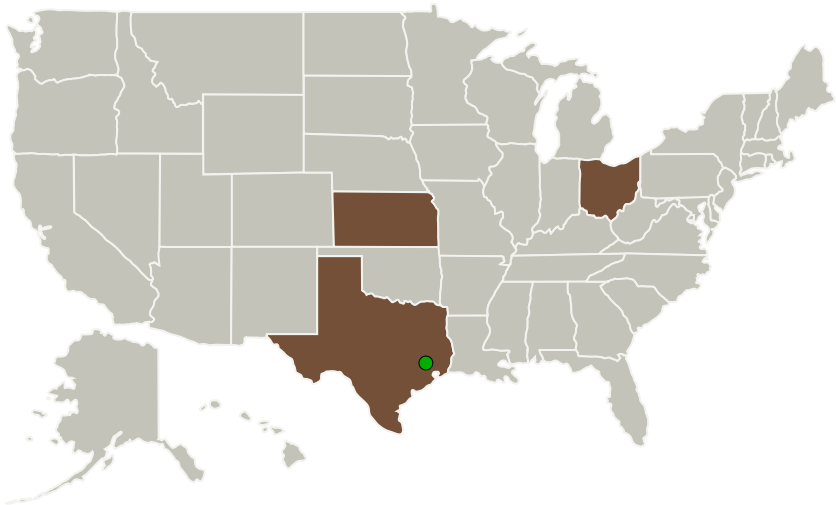

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Table of Contents

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Organizations Performing Work	Role	Type	Location
Nanoscale Materials, Inc.	Lead Organization	Industry	Manhattan, Kansas
Battelle Memorial Institute	Supporting Organization	R&D Center	Columbus, Ohio
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Kansas	Ohio
Texas	

Project Transitions

January 2010: Project Start

January 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140146)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Nanoscale Materials, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

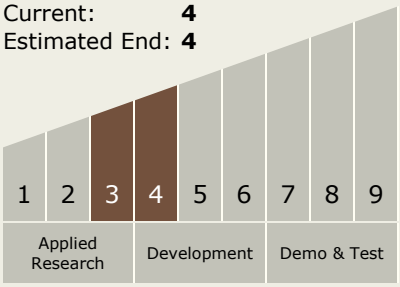
Carlos Torrez

Principal Investigator:

Slawomir Winecki

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.1 Materials
    - TX12.1.6 Materials for Electrical Power Generation, Energy Storage, Power Distribution and Electrical Machines

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System